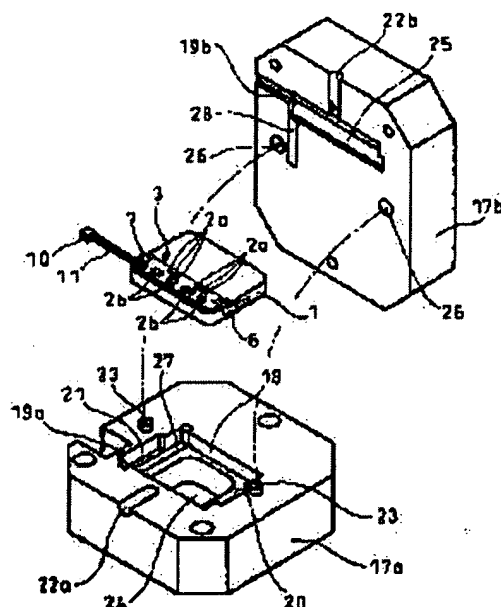


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**SOLUTION:** In this manufacturing method, a circuit board 3 is disposed on the predetermined position of a battery cell 1, the circuit board 3 is electrically connected to the battery cell 1 through positive and negative electrode terminals 6 and 7, the battery cell 1 is placed in molds 17a and 17b to be poured with a resin and at least the circuit board 3 is coated with and formed of the resin among the circuit board 3 and the positive and negative electrode terminals 6 and 7.



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CLAIMS

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## [Claim(s)]

[Claim 1] Dc-battery structure which is the dc-battery structure equipped with the circuit board prepared in the necessary location of a battery cell, the positive-electrode terminal which connects this circuit board and a battery cell electrically, and the negative-electrode terminal which connects said circuit board and battery cell electrically, and is characterized by having covered the circuit board with resin in said circuit board and a positive-electrode terminal list at least among negative-electrode terminals, and forming the resin shaping section in them.

[Claim 2] Dc-battery structure according to claim 1 which made resin a polyamide or polyurethane.

[Claim 3] While using as the top-face cross direction edge of a battery cell the location in which the circuit board is prepared to a battery cell into the part by the side of the battery-cell top-face cross direction center section on this circuit board, arrange components with thin thickness, and components with thick thickness are arranged into the part of battery-cell top-face cross direction one end on the circuit board. Dc-battery structure according to claim 1 or 2 which established an inclined plane where thickness becomes small as a battery-cell top-face cross direction center section is approached in the resin shaping section which covers said circuit board and is formed in a battery-cell top face.

[Claim 4] Dc-battery structure according to claim 1 or 2 which made the location in which the circuit board is prepared to a battery cell the side face of a battery cell.

[Claim 5] The manufacture approach of the dc-battery which installs a battery cell in metal mold, slushes resin, and is characterized by carrying out covering shaping of the circuit board by resin at least among negative-electrode terminals at said circuit board and a positive-electrode terminal list after connecting this circuit board and a battery cell electrically through a positive-electrode terminal and a negative-electrode terminal, while preparing the circuit board in the necessary location of a battery cell.

[Claim 6] The manufacture approach of a dc-battery according to claim 5 of having been made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin.

[Claim 7] The circuit board prepared in the necessary location of a battery cell, and the positive-electrode terminal which connects this circuit board and a battery cell electrically, It has the negative-electrode terminal which connects said circuit board and battery cell electrically. Dc-battery structure which is the dc-battery structure united with a cell lid inside, and is characterized by having covered the circuit board with resin at least among negative-electrode terminals in said circuit board and a positive-electrode terminal list, and fixing a battery cell to a cell lid inside with this resin.

[Claim 8] Dc-battery structure according to claim 7 which made resin a polyamide or polyurethane.

[Claim 9] While preparing the circuit board in the necessary location of a battery cell, this circuit board and a battery cell are electrically connected through a positive-electrode terminal and a negative-electrode terminal. Installing this cell lid and a battery cell in metal mold, slushing resin, and carrying out covering shaping of the circuit board by resin at least among negative-electrode terminals at said circuit board and a positive-electrode terminal list, after arranging this battery cell in a cell lid inside The manufacture approach of the dc-battery characterized by fixing a battery cell to a cell lid inside with this resin.

[Claim 10] The manufacture approach of a dc-battery according to claim 9 of having been made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin.

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[Translation done.]

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DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the suitable technique for a small pocket device like especially a portable telephone about dc-battery structure and its manufacture approach.

[0002]

[Description of the Prior Art] Conventionally the dc-battery of portable telephones, such as a cellular phone and PHS (personal handy phone) As shown in drawing 17 , the components 2, such as IC, are attached in the side face of a battery cell 1, and the circuit board 3 aiming at the electrical protection of a dc-battery in a charge control list While carrying out spot welding of the positive-electrode terminal 6 by which arranges through an insulation sheet 4 and a spacer 5, and spot welding is carried out to the electrode of the end section of this circuit board 3 to the positive electrode (not shown) of a battery cell 1 Spot welding of the negative-electrode terminal 7 by which spot welding is carried out to the electrode of the other end of said circuit board 3 is carried out to the negative electrode 8 of a battery cell 1. Said positive-electrode terminal 6 and the negative-electrode terminal 7 are covered with the terminal sheet 9, respectively. The end face section of a connecting cord 11 which has a connector 10 at the tip installed from said circuit board 3 is fixed to a battery cell 1 with a reinforcing tape 12. Furthermore, by covering said circuit board 3 front face with a guard plate 13, putting heat-shrinkable tubing 14 on said battery-cell 1 whole, and heating this heat-shrinkable tubing 14 to necessary temperature As a finished product of a dc-battery as made contract this heat-shrinkable tubing 14, had the configuration which comes to stick on the front face the face plate 15 which wrote a model name, rating, etc. and shown in drawing 18 It connects with the connector by the side of portable telephone, and this portable telephone is loaded with a connector 10.

[0003] Moreover, in addition to this, in the former, as shown in drawing 19 , while carrying out spot welding through PTC40 for stopping the positive-electrode terminal 6 to the positive electrode of a battery cell 1, and stopping supply of a current at the time of an elevated temperature etc. Carry out spot welding of the negative-electrode terminal 7 to the negative electrode of a battery cell 1, and spot welding of said positive-electrode terminal 6 and negative-electrode terminal 7 is carried out to the electrode with which the circuit board 3 corresponds, respectively. The circuit board 3 is electrically connected to a battery cell 1. In the need part of this battery cell 1 The insulation sheets 41, 42, 43, 44, 45, and 46 for performing an electric insulation are stuck. The terminal 47 for connection to the body side of the portable telephone which is not illustrated to said circuit board 3 is attached. Said battery cell 1 is stuck on the inside of the cell lid 32 with a double-sided tape 48. By carrying out ultrasonic welding of epiboly and the periphery section of this covering 50 for covering 50 to this battery cell 1 to cell lid 32 inside through a spacer 49, and sticking an insulation sheet 51 on the front face of said covering 50 further The dc-battery united with cell lid 32 inside as shown in drawing 20 is constituted, and there are some which equipped the body side of portable telephone with this dc-battery together with the cell lid 32.

[0004]

[Problem(s) to be Solved by the Invention] However, with the dc-battery structure of the \*\*\*\* former shown in drawing 17 and drawing 18 , since a user decomposed easily while leading to a cost rise, in order that components mark may require a man day and great in an assembly, there was also a possibility that short-circuit of a terminal area etc. might occur.

[0005] Moreover, with the dc-battery structure of the \*\*\*\* former shown in drawing 19 and drawing 20 , in order that components mark might require a man day and great in an assembly, while leading to the cost rise like the above-mentioned, for the structure which puts a battery cell 1 with the cell lid 32 and covering 50 from both-sides side, the thickness of a dc-battery became thick and there was a possibility of

causing trouble to thin shape-ization.

[0006] Furthermore, the terminal 47 for connection in the conventional dc-battery shown in drawing 19 and drawing 20 needed to be mounted in the circuit board 3 of a battery cell 1 again as an expensive thing which fabricated resin and a sheet metal to coincidence so that it might not deform with the spring pressure of the spring terminal by the side of the body of portable telephone.

[0007] While this invention assembles in a components mark list, can reduce a man day sharply and can aim at a cost cut in view of this actual condition A user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc. The suitable dc-battery structure for a pocket device and its manufacture approaches, such as portable telephone which can aim at improvement in dependability, are offered. Moreover, when a battery cell is united with a cell lid inside, while assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut A user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc. Improvement in dependability can be aimed at and it is going to offer further the suitable dc-battery structure for a pocket device and its manufacture approaches, such as portable telephone which can also attain lightweight-ization in the thin shape-ized list of a dc-battery.

[0008]

[Means for Solving the Problem] The circuit board by which this invention was prepared in the necessary location of a battery cell, and the positive-electrode terminal which connects this circuit board and a battery cell electrically, It is the dc-battery structure equipped with the negative-electrode terminal which connects said circuit board and battery cell electrically, and the dc-battery structure characterized by having covered the circuit board with resin in said circuit board and a positive-electrode terminal list at least among negative-electrode terminals, and forming the resin shaping section in them is started.

[0009] In said dc-battery structure, it is effective to make resin into a polyamide or polyurethane.

[0010] Moreover, while using as the top-face cross direction edge of a battery cell the location in which the circuit board is prepared to a battery cell into the part by the side of the battery-cell top-face cross direction center section on this circuit board, arrange components with thin thickness, and components with thick thickness are arranged into the part of battery-cell top-face cross direction one end on the circuit board. An inclined plane where thickness becomes small may be established in the resin shaping section which covers said circuit board and is formed in a battery-cell top face as a battery-cell top-face cross direction center section is approached.

[0011] Furthermore, the location in which the circuit board is prepared to a battery cell can also be made into the side face of a battery cell again.

[0012] Moreover, after this invention connects this circuit board and a battery cell electrically through a positive-electrode terminal and a negative-electrode terminal while preparing the circuit board in the necessary location of a battery cell, it installs a battery cell in metal mold, slushes resin, and starts the manufacture approach of the dc-battery characterized by carrying out covering shaping of the circuit board by resin at least among negative-electrode terminals at said circuit board and a positive-electrode terminal list.

[0013] In the manufacture approach of said dc-battery, it is desirable that it is made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin.

[0014] Moreover, the circuit board by which this invention was prepared in the necessary location of a battery cell, It has the positive-electrode terminal which connects this circuit board and a battery cell electrically, and the negative-electrode terminal which connects said circuit board and battery cell electrically. It is the dc-battery structure united with a cell lid inside. In said circuit board and a positive-electrode terminal list The inside of a negative-electrode terminal, It is effective to start the dc-battery structure characterized by having covered the circuit board with resin at least, and fixing a battery cell to a cell lid inside with this resin, and to make resin into a polyamide or polyurethane also in this case.

[0015] Moreover, while this invention prepares the circuit board in the necessary location of a battery cell This circuit board and a battery cell are electrically connected through a positive-electrode terminal and a negative-electrode terminal. Installing this cell lid and a battery cell in metal mold, slushing resin, and carrying out covering shaping of the circuit board by resin at least among negative-electrode terminals at said circuit board and a positive-electrode terminal list, after arranging this battery cell in a cell lid inside It is desirable that the manufacture approach of the dc-battery characterized by fixing a battery cell to a cell lid inside with this resin is started, and it is made to perform covering shaping with low temperature and low voltage also in this case, using a polyamide or polyurethane as resin.

[0016] According to the above-mentioned means, the following operations are acquired.

[0017] In the dc-battery structure of this invention, while the circuit board is prepared in the necessary location of a battery cell This circuit board and a battery cell are electrically connected through a positive-electrode terminal and a negative-electrode terminal, the circuit board is covered with resin at least, and

the resin shaping section is formed. By this Since the circuit board of a battery cell is completely sealed by the resin shaping section, while electric reinforcement is obtained by the high mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, it stops generating short-circuit of a terminal area etc.

[0018] In said dc-battery structure, the time amount which this polyamide and polyurethane can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ] since softening temperature is low and the viscosity at the time of melting also has it, and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board by heat or injection pressure by this, and is spent on shaping is also can also be shortened if resin is made into a polyamide or polyurethane. [ low ]

[0019] Moreover, although a battery cell has the inclination for the center section to expand to convex, in connection with a surrounding temperature rise While using as the top-face cross direction edge of a battery cell the location in which the circuit board is prepared to a battery cell Into the part by the side of the battery-cell top-face cross direction center section on this circuit board, arrange components with thin thickness, and components with thick thickness are arranged into the part of battery-cell top-face cross direction one end on the circuit board. If an inclined plane where thickness becomes small is established in the resin shaping section which covers said circuit board and is formed in a battery-cell top face as a battery-cell top-face cross direction center section is approached Even if it was made at desertion in the train [ of a flame world ] etc. and the battery cell expanded in the hot ambient atmosphere, there will be no fear of the effect appearing in the pocket device equipped with a battery cell.

[0020] Furthermore, if the location in which the circuit board is prepared to a battery cell is made into the side face of a battery cell again, even if the center section expands to convex in connection with the temperature rise around a battery cell, a fear of the effect appearing in the pocket device equipped with a battery cell will completely disappear.

[0021] Moreover, it sets to the manufacture approach of the dc-battery of this invention. While the circuit board was prepared in the necessary location of a battery cell, after this circuit board and a battery cell were electrically connected through the positive-electrode terminal and the negative-electrode terminal, A battery cell is installed in metal mold, resin is slushed, and covering shaping of the circuit board is carried out by resin at least, and it becomes possible to stabilize and manufacture, having electric reinforcement in a high mechanical-strength list, and aiming at a cost cut for a reliable dc-battery.

[0022] In the manufacture approach of said dc-battery, if it is made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin, it will become avoidable about a bad influence being done to the circuit board with heat or injection pressure, and, moreover, shortening of the time amount spent on shaping at the simplification list of a manufacturing installation will also be attained.

[0023] In the dc-battery structure united with the cell lid inside of this invention on the other hand The circuit board is covered at least with resin by the circuit board and the positive-electrode terminal list among negative-electrode terminals, and a battery cell fixes to a cell lid inside with this resin. By this Since the circuit board of a battery cell is completely sealed by the resin shaping section, while electric reinforcement is obtained by the high mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, Since it stops generating short-circuit of a terminal area etc. and it moreover is not necessary to put a battery cell with a cell lid and covering from both-sides side, Since the thickness of a dc-battery does not become thick, but lightweight-ization is attained at a thin shape-ized list and the circuit board is certainly being further fixed with resin also considering the input/output terminal mounted in the circuit board of a battery cell as easy structure of sheet metal work, If cost reduction also becomes possible and resin is made into a polyamide or polyurethane in said dc-battery structure while being able to maintain sufficient reinforcement Since softening temperature is low and the viscosity at the time of melting of this polyamide and polyurethane is also low, The time amount which can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ], and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board by heat or injection pressure by this, and is spent on shaping is also can also be shortened.

[0024] Moreover, it sets to the manufacture approach of the dc-battery united with the cell lid inside of this invention. While the circuit board is prepared in the necessary location of a battery cell, this circuit board and a battery cell are electrically connected through a positive-electrode terminal and a negative-electrode terminal. This cell lid and a battery cell being installed in metal mold, resin being slushed, and covering shaping of the circuit board being carried out by resin at least among negative-electrode

terminals at said circuit board and a positive-electrode terminal list, after this battery cell is arranged by the cell lid inside In order for a battery cell to fix to a cell lid inside with this resin, consequently to press down a cell lid and a battery cell with metal mold in a manufacture process, It becomes the form where the curvature of a cell lid and expansion of a battery cell are corrected, and has electric reinforcement in a high mechanical-strength list. A dc-battery with high dependability and dimensional accuracy Become possible to stabilize and manufacture, aiming at a cost cut, and it sets to the manufacture approach of said dc-battery further. If it is made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin, it will become avoidable about a bad influence being done to the circuit board with heat or injection pressure, and, moreover, shortening of the time amount spent on shaping at the simplification list of a manufacturing installation will also be attained.

[0025]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with the example of illustration.

[0026] Drawing 1 - drawing 4 are examples of a gestalt which carry out this invention, and the part which attached the same sign as drawing 17 and drawing 18 expresses the same object among drawing.

[0027] As shown in drawing 1 , while sticking the circuit board 3 on the top-face cross direction edge of a battery cell 1 with the double-sided tapes 16, such as a polyethylene sheet, in this example of illustration The electrode of the end section of this circuit board 3 and the positive electrode of a battery cell 1 are electrically connected by carrying out spot welding of the positive-electrode terminal 6. And the electrode of the other end of said circuit board 3 and the negative electrode 8 of a battery cell 1 are electrically connected by carrying out spot welding of the negative-electrode terminal 7. The battery cell 1 which assembled as shown in drawing 2 , and stuck said circuit board 3 Install in metal mold 17a manufactured with metals, such as an aluminium alloy as shown in drawing 3 , and 17b, and resin, such as a polyamide, is slushed. As covering shaping of said circuit board 3 and positive-electrode terminal 6, and the negative-electrode terminal 7 is carried out by resin and it is shown in drawing 4 , the resin shaping section 29 is formed, the face plate 15 which wrote a model name, rating, etc. is stuck on the inferior surface of tongue of a battery cell 1, and it is made to have completed the dc-battery.

[0028] The dc-battery attachment slot 18 which puts the battery cell 1 which stuck said circuit board 3 into said metal mold 17a as shown in drawing 3 , Code drawer slot 19a for pulling out the connecting cord 11 prolonged from the circuit board 3, The positive-electrode terminal covering resin restoration slot 20 where wrap resin is filled up with the part of the positive-electrode terminal 6 of a battery cell 1, The negative-electrode terminal covering resin restoration slot 21 where wrap resin is filled up with the part of the negative-electrode terminal 7 of a battery cell 1, Resin impregnation slot 22a for resin impregnation and the guide pin 23 for positioning to metal mold 17b are formed. At the dc-battery attachment slot 18 pars basilaris ossis occipitalis of said metal mold 17a The opening 24 for extruding a battery cell 1 from the dc-battery attachment slot 18 of metal mold 17a after the completion of resin shaping of battery-cell 1 front face is formed.

[0029] Moreover, the circuit board covering resin restoration slot 25 which wrap resin is filled up with the part of the circuit board 3 of a battery cell 1, and is open for free passage into the positive-electrode terminal covering resin restoration slot 20 of said metal mold 17a, and the negative-electrode terminal covering resin restoration slot 21 as shown in said metal mold 17b at drawing 3 , Resin impregnation slot 22b for aligning with code drawer slot 19b for pulling out said connecting cord 11, and resin impregnation slot 22of said metal mold 17a a, and pouring in resin to said circuit board covering resin restoration slot 25, The guide hole 26 for positioning where the guide pin 23 of said metal mold 17a is inserted is formed.

[0030] In addition, said battery cell 1 is covered by shell, such as aluminum, and is usually set to the production process. Although opening of said shell is covered, laser beam welding of that periphery section is carried out to the last and the variation in a dimension arises in this welding part after being filled up with a cell member in the shell to which opening of the negative-electrode 8 side of a battery cell 1 was carried out In order to absorb the variation in this dimension, in the pars-basilaris-ossis-occipitalis list by the side of the negative-electrode terminal covering resin restoration slot 21 of the dc-battery attachment slot 18 of said metal mold 17a in the both-sides section While having embedded the elastic member 27 which consists of sponge of a silicon system which bears the melting temperature of resin, the elastic member 28 of the same quality of the material is embedded in the correspondence location of said metal mold 17b.

[0031] On the other hand, the resin shaping section 29 formed in said battery-cell 1 top face In order to make this inclined plane 30 easy to have formed the inclined plane 30 where thickness becomes small as the top-face cross direction center section of the battery cell 1 is approached, and to form Components arrangement of IC on the circuit board 3 embedded to the interior of the resin shaping section 29 formed in battery-cell 1 top face etc. As shown in drawing 2 , into the part by the side of the top-face cross

direction center section of the battery cell 1, components 2a with thin thickness is arranged, and components 2b with thick thickness is arranged into the part of top-face cross direction one end of a battery cell 1.

[0032] Next, the procedure of manufacturing the dc-battery in the above-mentioned example of illustration is explained.

[0033] First, as shown in drawing 1, while the circuit board 3 is stuck on the top-face cross direction edge of a battery cell 1 with the double-sided tapes 16, such as a polyethylene sheet When the electrode of the end section of this circuit board 3 and the positive electrode of a battery cell 1 carry out spot welding of the positive-electrode terminal 6, it connects electrically. And when the electrode of the other end of said circuit board 3 and the negative electrode 8 of a battery cell 1 carry out spot welding of the negative-electrode terminal 7, it connects electrically, and as shown in drawing 2, the assembly of a battery cell 1 is performed.

[0034] Then, the battery cell 1 which stuck said circuit board 3 As shown in drawing 3, where it was put in in the dc-battery attachment slot 18 of metal mold 17a and the connecting cord 11 of a battery cell 1 is pulled out from code drawer slot 19a in the exterior of metal mold 17a Metal mold 17a and 17b is unified, it is fixed with the fixture which is not illustrated, and resin, such as a polyamide, is poured in from the resin impregnation slots 22a and 22b so that the guide hole 26 of metal mold 17b may fit in to the guide pin 23 for positioning of metal mold 17a. here, since the elastic members 27 and 28 which become the both sides section and the correspondence location of said metal mold 17b from the sponge of a silicon system which bear the melting temperature of resin be embed in the pars basilaris ossis occipitalis list by the side of the negative electrode terminal covering resin restoration slot 21 of the dc-battery attachment slot 18 of said metal mold 17a, even if the variation in a dimension have arise in the welding part of the shell of a battery cell 1, the variation in this dimension be absorb by said elastic members 27 and 28.

[0035] If resin, such as a polyamide, is poured in from said resin impregnation slots 22a and 22b, the positive-electrode terminal covering resin restoration slot 20 and the negative-electrode terminal covering resin restoration slot 21 will also be filled up with it while filling up with this resin in the circuit board covering resin restoration slot 25.

[0036] The time amount which this polyamide can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ] since softening temperature is low and the viscosity at the time of melting also has it, and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board 3 by heat or injection pressure by this, and is spent on shaping is also can also be shortened if a polyamide is used as said resin. [ low ] Moreover, if the polyurethane resin of a humidity hardening mold is used as said resin, low temperature and shaping in low voltage are possible like said polyamide. This has [ this polyurethane resin ] a molding temperature still lower than the polyamide resin like molding temperature 210 [\*\*] at 130 [\*\*] extent. Therefore, when polyurethane is used as said resin, it is very effective in there being not only no bad influence to the circuit board, but carrying out resin shaping of the battery cell which is easy to deteriorate at an elevated temperature like a polymer battery.

[0037] After the resin with which said circuit board covering resin restoration slot 25, and the positive-electrode terminal covering resin restoration slot 20 and the negative-electrode terminal covering resin restoration slot 21 were filled up hardens, If cancel immobilization by said fixture, metal mold 17b is removed from metal mold 17a, a battery cell 1 is extruded from the opening 24 of metal mold 17a and it takes out from the dc-battery attachment slot 18 As shown in drawing 4, the wrap resin shaping section 29 is formed in a battery cell 1 in said circuit board 3 and positive-electrode terminal 6, and the negative-electrode terminal 7, and a dc-battery will be completed if the face plate 15 which wrote a model name, rating, etc. is stuck on the inferior surface of tongue of this battery cell 1.

[0038] Since it becomes impossible for a user to decompose simply while electric reinforcement is obtained by the high mechanical strength list, and components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former since it is completely sealed by the resin shaping section 29, the circuit board 3, the positive electrode terminal 6, and the negative electrode terminal 7 of a battery cell 1 stop thereby, generating short-circuit of a terminal area etc.

[0039] Moreover, although a battery cell 1 has the inclination for the center section to expand to convex, in connection with a surrounding temperature rise The resin shaping section 29 formed in battery-cell 1 top face Since the inclined plane 30 where thickness becomes small is formed as are shown in drawing 4 and drawing 5, and the top-face cross direction center section of the battery cell 1 is approached, Even if the portable telephone 31 is made at desertion in the train [ of a flame world ] etc. and a battery cell 1 expands in a hot ambient atmosphere, there will be no fear of the effect appearing in the portable telephone 31. In addition, 32 are the cell lid of the portable telephone 31 among drawing 5.

[0040] At the time of expansion when drawing 6 and drawing 7 establish the above inclined planes 30 in



the resin shaping section 29 It is what shows the time of the expansion when not forming an inclined plane 30, respectively. Although the resin shaping section 29 of the dc-battery which expanded interferes with the cell lid 32 of the portable telephone 31, and there is a possibility that the cell lid 32 may break away when the worst when the height of a dc-battery is set to  $h_2 > h_1$  and it does not form an inclined plane 30 When an inclined plane 30 is formed, interference with the resin shaping section 29 of a dc-battery and the cell lid 32 of the portable telephone 31 which expanded is avoided, and balking of the cell lid 32 is also prevented.

[0041] In this way, while assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., and can aim at improvement in dependability.

[0042] Although drawing 8 and drawing 9 are the modifications of the gestalt which carries out this invention, the part which attached the same sign as drawing 1 - drawing 4 expresses the same object among drawing and the fundamental configuration is the same as that of the example shown in drawing 1 - drawing 4 The place by which it is characterized [ of this example of illustration ] makes the attachment location of the circuit board 3 to a battery cell 1 the side face of a battery cell 1, as shown in drawing 8 and drawing 9 . It is in the point which covers the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 with resin, such as a polyamide, and formed the resin shaping section 29.

[0043] On the relation which covers with resin the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 which were stuck on the side face of a battery cell 1 in the case of the example shown in drawing 8 and drawing 9 , and forms the resin shaping section 29, The dc-battery attachment slots 18a and 18b which put the battery cell 1 which stuck the circuit board 3 into metal mold 17a and 17b, The code drawer slots 19a and 19b for pulling out the connecting cord 11 prolonged from the circuit board 3, The positive-electrode terminal covering resin restoration slots 20a and 20b where wrap resin is filled up with the part of the positive-electrode terminal 6 of a battery cell 1, The negative-electrode terminal covering resin restoration slots 21a and 21b where wrap resin is filled up with the part of the negative-electrode terminal 7 of a battery cell 1, The circuit board covering resin restoration slots 25a and 25b which wrap resin is filled up with the part of the circuit board 3 of a battery cell 1, and are open for free passage into said positive-electrode terminal covering resin restoration slots 20a and 20b and the negative-electrode terminal covering resin restoration slots 21a and 21b, There are not an example which shows the resin impregnation slots 22a and 22b for pouring in resin to these circuit board covering resin restoration slots 25a and 25b to drawing 1 - drawing 4 about the other point although it is made to have prepared so that vertical omitting may become symmetrical, and a place which almost changes.

[0044] The attachment location of the circuit board 3 to a battery cell 1 is made into the side face of a battery cell 1 like the example shown in drawing 8 and drawing 9 . Even if it covers the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 with resin, such as a polyamide, and forms the resin shaping section 29 Like the example shown in drawing 1 - drawing 4 , the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 of a battery cell 1 Since it is completely sealed by the resin shaping section 29, while electric reinforcement is obtained by the high mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, it stops generating short-circuit of a terminal area etc.

[0045] Moreover, even if the center section expands to convex in connection with the temperature rise around a battery cell 1 by forming said resin shaping section 29 in the side face of a battery cell 1, a fear of the effect appearing in the portable telephone 31 completely disappears.

[0046] In this way, while assembling in a components mark list also in the example shown in drawing 8 and drawing 9 , being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., and can aim at improvement in dependability.

[0047] Although drawing 10 and drawing 11 are other modifications of the gestalt which carries out this invention, the part which attached the same sign as drawing 1 - drawing 4 expresses the same object among drawing and the fundamental configuration is the same as that of the example shown in drawing 1 - drawing 4 The place by which it is characterized [ of this example of illustration ] is in the point which covers the battery-cell 1 whole which stuck the circuit board 3 with resin, such as a polyamide, and formed the resin shaping section 29, as shown in drawing 10 and drawing 11 .

[0048] On the relation which in the case of the example shown in drawing 10 and drawing 11 covers the battery-cell 1 whole with resin, and forms the resin shaping section 29, The whole inferior surface of tongue and whole side face of a battery cell 1 are established for somewhat larger dc-battery attachment slot 18' than the appearance of the battery cell 1 of a wrap sake in metal mold 17a by resin. And while



forming the support projection 33 for supporting a battery cell 1 in the pars basilaris ossis occipitalis of this dc-battery attachment slot 18'. The whole top face of a battery cell 1 is established for top-face covering resin restoration slot 25' of a wrap sake in metal mold 17b by resin. And although the support projection 34 for making the top-face necessary part of a battery cell 1 contact, and restraining a motion in the vertical direction of this battery cell 1 is formed in the interior of this top-face covering resin restoration slot 25', about the other point, there are not an example shown in drawing 1 - drawing 4 and a place which almost changes.

[0049] When the battery-cell 1 whole is covered with resin and the resin shaping section 29 is formed like the example shown in drawing 10 and drawing 11, the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 of a battery cell 1 Since sealing performance is raised more by the resin shaping section 29, while electric reinforcement is obtained by the still higher mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, it stops generating short-circuit of a terminal area etc.

[0050] In this way, while assembling in a components mark list also in the example shown in drawing 10 and drawing 11, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., and can aim at improvement in dependability.

[0051] Drawing 12 - drawing 15 are the second example of the gestalt which carries out this invention. The inside of drawing, While carrying out spot welding of the part which attached the same sign as drawing 19 - drawing 20 through PTC40 to stop the positive-electrode terminal 6 to the positive electrode of a battery cell 1, and stop [ express the same object, ] supply of a current at the time of an elevated temperature etc. Carry out spot welding of the negative-electrode terminal 7 to the negative electrode of a battery cell 1, and spot welding of said positive-electrode terminal 6 and negative-electrode terminal 7 is carried out to the electrode with which the circuit board 3 corresponds, respectively. Connect the circuit board 3 electrically to a battery cell 1, and the insulation sheet 52 for an insulation of the positive-electrode terminal 6 and battery cell 1 accompanied by said PTC40 is made to be placed between the side faces of a battery cell 1. It attaches so that a holder 54 may be put on the circuit board 3 through a double-sided tape 53. Said battery cell 1 is stuck on the inside of the cell lid 32 with a double-sided tape 48. The battery cell 1 which assembled as shown in drawing 13, and was united with said cell lid 32 While carrying out covering shaping of the circuit board 3 on which it installed in metal mold 17a manufactured with metals, such as an aluminium alloy as shown in drawing 14, and 17b, resin, such as a polyamide, was slushed into the inside of said holder 54, and this holder 54 was put by resin As a battery cell 1 is fixed to cell lid 32 inside with this resin and it is shown in drawing 15, the resin shaping section 29 is formed and it is made to complete a dc-battery, carrying out covering shaping of the perimeter of the battery cell 1 containing the positive-electrode terminal 6 and the negative-electrode terminal 7 by resin.

[0052] As shown in drawing 12, in case the guide slot 56 corresponding to the input/output terminal 55 arranged in circuit board 3 front face is formed and the body side of portable telephone is equipped with a dc-battery, said guide slot 56 serves as a guide of the cell terminal by the side of the body of portable telephone, and it enables it to have contacted said holder 54 smoothly in both terminals.

[0053] As shown in drawing 12, the double-sided tape 48 which sticks a battery cell 1 to said cell lid 32 is made into the shape of a frame which extracted the center section, and it is made to have absorbed expansion of the center section of the battery cell 1 at the time of a full charge and an elevated temperature.

[0054] The dc-battery attachment slot 18 which puts said battery cell 1 of the cell lid 32 and one into said metal mold 17a as shown in drawing 14, Resin impregnation slot 22a for resin impregnation and the guide pin 23 for positioning to metal mold 17b are formed. At the dc-battery attachment slot 18 pars basilaris ossis occipitalis of said metal mold 17a The opening 24 for extruding a dc-battery from the dc-battery attachment slot 18 of metal mold 17a after the completion of resin shaping of a dc-battery is formed.

[0055] Moreover, resin impregnation slot 22b for said metal mold 17b aligning with resin impregnation slot 22a of said metal mold 17a, and pouring resin into it, as shown in drawing 14, The guide hole 26 for positioning where the guide pin 23 of said metal mold 17a is inserted, The resin restoration slot 57 where it fills up with the resin poured in from said resin impregnation slots 22a and 22b, the reinforcing rib 58 for reinforcing and supporting the cell lid 32 at the time of restoration of resin, and the passage where it fills up with resin are formed, and the resin seal rib 59 of a \*\*\*\*\* sake is formed for resin.

[0056] Next, the procedure of manufacturing the dc-battery in the above-mentioned example of illustration is explained.

[0057] First, as shown in drawing 12, while spot welding of the positive-electrode terminal 6 is carried out to the positive electrode of a battery cell 1 through PTC40 Spot welding of the negative-electrode

terminal 7 is carried out to the negative electrode of a battery cell 1, and spot welding of said positive-electrode terminal 6 and negative-electrode terminal 7 is carried out to the electrode with which the circuit board 3 corresponds, respectively. The circuit board 3 is electrically connected to a battery cell 1, and it is placed between the side faces of a battery cell 1 by the insulation sheet 52 for an insulation of the positive-electrode terminal 6 and battery cell 1 accompanied by said PTC40. It is attached so that a holder 54 may be put on the circuit board 3 through a double-sided tape 53, said battery cell 1 is stuck on the inside of the cell lid 32 with a double-sided tape 48, and as shown in drawing 13, the assembly of a battery cell 1 is performed.

[0058] Then, the battery cell 1 united with said cell lid 32 So that it may be put in in the dc-battery attachment slot 18 of metal mold 17a and the guide hole 26 of metal mold 17b may fit in to the guide pin 23 for positioning of metal mold 17a, as shown in drawing 14 Metal mold 17a and 17b is unified, it is fixed with the fixture which is not illustrated, and resin, such as a polyamide, is poured in from the resin impregnation slots 22a and 22b.

[0059] When resin, such as a polyamide, is poured in from said resin impregnation slots 22a and 22b, this resin While covering shaping of the circuit board 3 on which it flowed into the inside of a holder 54 and this holder 54 was put is carried out by resin It fills up with said resin in the resin restoration slot 57, and covering shaping is carried out by resin and a battery cell 1 also fixes the perimeter of the battery cell 1 containing the positive-electrode terminal 6 and the negative-electrode terminal 7 to cell lid 32 inside with this resin.

[0060] The time amount which this polyamide can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ] since softening temperature is low and the viscosity at the time of melting also has it, and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board 3 by heat or injection pressure by this, and is spent on shaping is also can also be shortened if a polyamide is used as said resin. [ low ] Moreover, if the polyurethane resin of a humidity hardening mold is used as said resin, low temperature and shaping in low voltage are possible like said polyamide. This has [ this polyurethane resin ] a molding temperature still lower than the polyamide resin like molding temperature 210 [\*\*] at 130 [\*\*] extent. Therefore, when polyurethane is used as said resin, it is very effective in there being not only no bad influence to the circuit board, but carrying out resin shaping of the battery cell which is easy to deteriorate at an elevated temperature like a polymer battery.

[0061] If cancel immobilization by said fixture, metal mold 17b is removed from metal mold 17a, the battery cell 1 which fixed to cell lid 32 inside is extruded from the opening 24 of metal mold 17a and it takes out from the dc-battery attachment slot 18 after the resin with which it filled up in said metal mold 17a and 17b hardens, as shown in drawing 15, the resin shaping section 29 will be formed and the dc-battery united with the cell lid 32 will be completed.

[0062] By this the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 of a battery cell 1 In order that it may be completely sealed by the resin shaping section 29 and a battery cell 1 may fix to cell lid 32 inside by this resin shaping section 29, while electric reinforcement is obtained by the high mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, Since it stops generating short-circuit of a terminal area etc. and it moreover is not necessary to put a battery cell 1 with the cell lid 32 and covering 50 (to refer to drawing 19) from both-sides side, the thickness of a dc-battery does not become thick but lightweight-ization of it is attained at a thin shape-ized list.

[0063] Moreover, although the terminal 47 for connection in the conventional dc-battery shown in drawing 19 and drawing 20 needs to mount in the circuit board 3 of a battery cell 1 as an expensive thing which fabricated resin and a sheet metal to coincidence so that it may not deform with the spring pressure of the spring terminal by the side of the body of portable telephone Since the circuit board 3 is certainly being fixed with resin also as easy structure of sheet metal work, while the input/output terminal 55 mounted in the circuit board 3 of the battery cell 1 in this example of illustration can maintain sufficient reinforcement, the cost reduction of it also becomes possible.

[0064] Furthermore, since the cell lid 32 and a battery cell 1 are pressed down with metal mold 17a and 17b in a manufacture process, the curvature of the cell lid 32 and expansion of a battery cell 1 are corrected, and manufacture of a dc-battery with high dimensional accuracy is attained again.

[0065] In this way, while assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., can aim at improvement in dependability, and can also aim at improvement in lightweight-izing and dimensional accuracy in a thin shape-ized list further.

[0066] Although the thing of a type which makes connection to the body side of portable telephone by the

input/output terminal 55 was explained to drawing 12 - drawing 15 As shown in drawing 16 , by the connector 10 through a connecting cord 11 It is possible to form the resin shaping section 29 and to unify the cell lid 32 and a battery cell 1 about the battery cell 1 of a type which makes connection to the body side of portable telephone as well as the case of the example shown in drawing 12 - drawing 15 , and the same operation effectiveness as the above-mentioned is acquired also in this case.

[0067] In addition, the dc-battery structure and its manufacture approach of this invention are not limited only to the above-mentioned example of illustration, cover the circuit board 3 with resin, and are natural. [ of things for which modification can be variously added within limits to which it does not deviate from the summary of this invention -- it is also possible to cover the positive-electrode terminal 6 and the negative-electrode terminal 7 with another means -- ]

[0068]

[Effect of the Invention] As mentioned above, as explained, while according to the dc-battery structure of this invention according to claim 1 assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc., and the outstanding effectiveness that improvement in dependability can be aimed at can be done so.

[0069] According to the dc-battery structure of this invention according to claim 2, the outstanding effectiveness that the time amount which in addition to the above-mentioned effectiveness can fabricate with low temperature and low voltage as compared with common resin shaping, can avoid the bad influence to the circuit board by heat or injection pressure, and can simplify the equipment which manufacture takes, and is spent on shaping can also be shortened can be done so.

[0070] According to the dc-battery structure of this invention according to claim 3, in addition to the above-mentioned effectiveness, the outstanding effectiveness that the effect on the pocket device equipped with the battery cell by expansion of a battery cell can be controlled to the minimum can be further done so.

[0071] According to the dc-battery structure of this invention according to claim 4, in addition to the above-mentioned effectiveness, the outstanding effectiveness that the effect on the pocket device equipped with the battery cell by expansion of a battery cell can be lost completely can be further done so.

[0072] Moreover, according to the manufacture approach of the dc-battery of this invention according to claim 5, the outstanding effectiveness that it is stabilized and can manufacture can be done so, having electric reinforcement in a high mechanical-strength list, and aiming at a cost cut for a reliable dc-battery.

[0073] According to the manufacture approach of the dc-battery of this invention according to claim 6, in addition to the above-mentioned effectiveness, it can avoid that a bad influence is done by heat and injection pressure to the circuit board, and the outstanding effectiveness that shortening of the time amount spent on shaping at the simplification list of a manufacturing installation can also be attained can be done so.

[0074] On the other hand, when a battery cell is united with a cell lid inside, while according to the dc-battery structure of this invention according to claim 7 assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut A user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc. Can aim at improvement in dependability, can do so further the outstanding effectiveness that lightweight-ization can also be attained in the thin shape-ized list of a dc-battery, and according to the dc-battery structure of this invention according to claim 8 The outstanding effectiveness that the time amount which in addition to the above-mentioned effectiveness can fabricate with low temperature and low voltage as compared with common resin shaping, can avoid the bad influence to the circuit board by heat or injection pressure, and can simplify the equipment which manufacture takes, and is spent on shaping can also be shortened can be done so.

[0075] Moreover, when a battery cell is united with a cell lid inside according to the manufacture approach of the dc-battery of this invention according to claim 9 Can do so the outstanding effectiveness that it is stabilized and can manufacture, having electric reinforcement in a high mechanical-strength list, and aiming at a cost cut for a dc-battery with high dependability and dimensional accuracy, and according to the manufacture approach of the dc-battery of this invention according to claim 10 In addition to the above-mentioned effectiveness, it can avoid that a bad influence is done by heat and injection pressure to the circuit board, and the outstanding effectiveness that shortening of the time amount spent on shaping at the simplification list of a manufacturing installation can also be attained can be done so.

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TECHNICAL FIELD

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[Field of the Invention] This invention relates to the suitable technique for a small pocket device like especially a portable telephone about dc-battery structure and its manufacture approach.

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PRIOR ART

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[Description of the Prior Art] Conventionally the dc-battery of portable telephones, such as a cellular phone and PHS (personal handy phone) As shown in drawing 17 , the components 2, such as IC, are attached in the side face of a battery cell 1, and the circuit board 3 aiming at the electrical protection of a dc-battery in a charge control list While carrying out spot welding of the positive-electrode terminal 6 by which arranges through an insulation sheet 4 and a spacer 5, and spot welding is carried out to the electrode of the end section of this circuit board 3 to the positive electrode (not shown) of a battery cell 1 Spot welding of the negative-electrode terminal 7 by which spot welding is carried out to the electrode of the other end of said circuit board 3 is carried out to the negative electrode 8 of a battery cell 1. Said positive-electrode terminal 6 and the negative-electrode terminal 7 are covered with the terminal sheet 9, respectively. The end face section of a connecting cord 11 which has a connector 10 at the tip installed from said circuit board 3 is fixed to a battery cell 1 with a reinforcing tape 12. Furthermore, by covering said circuit board 3 front face with a guard plate 13, putting heat-shrinkable tubing 14 on said battery-cell 1 whole, and heating this heat-shrinkable tubing 14 to necessary temperature As a finished product of a dc-battery as made contract this heat-shrinkable tubing 14, had the configuration which comes to stick on the front face the face plate 15 which wrote a model name, rating, etc. and shown in drawing 18 It connects with the connector by the side of portable telephone, and this portable telephone is loaded with a connector 10.

[0003] Moreover, in addition to this, in the former, as shown in drawing 19 , while carrying out spot welding through PTC40 for stopping the positive-electrode terminal 6 to the positive electrode of a battery cell 1, and stopping supply of a current at the time of an elevated temperature etc. Carry out spot welding of the negative-electrode terminal 7 to the negative electrode of a battery cell 1, and spot welding of said positive-electrode terminal 6 and negative-electrode terminal 7 is carried out to the electrode with which the circuit board 3 corresponds, respectively. The circuit board 3 is electrically connected to a battery cell 1. In the need part of this battery cell 1 The insulation sheets 41, 42, 43, 44, 45, and 46 for performing an electric insulation are stuck. The terminal 47 for connection to the body side of the portable telephone which is not illustrated to said circuit board 3 is attached. Said battery cell 1 is stuck on the inside of the cell lid 32 with a double-sided tape 48. By carrying out ultrasonic welding of epiboly and the periphery section of this covering 50 for covering 50 to this battery cell 1 to cell lid 32 inside through a spacer 49, and sticking an insulation sheet 51 on the front face of said covering 50 further The dc-battery united with cell lid 32 inside as shown in drawing 20 is constituted, and there are some which equipped the body side of portable telephone with this dc-battery together with the cell lid 32.

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EFFECT OF THE INVENTION

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[Effect of the Invention] As mentioned above, as explained, while according to the dc-battery structure of this invention according to claim 1 assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc., and the outstanding effectiveness that improvement in dependability can be aimed at can be done so.

[0069] According to the dc-battery structure of this invention according to claim 2, the outstanding effectiveness that the time amount which in addition to the above-mentioned effectiveness can fabricate with low temperature and low voltage as compared with common resin shaping, can avoid the bad influence to the circuit board by heat or injection pressure, and can simplify the equipment which manufacture takes, and is spent on shaping can also be shortened can be done so.

[0070] According to the dc-battery structure of this invention according to claim 3, in addition to the above-mentioned effectiveness, the outstanding effectiveness that the effect on the pocket device equipped with the battery cell by expansion of a battery cell can be controlled to the minimum can be further done so.

[0071] According to the dc-battery structure of this invention according to claim 4, in addition to the above-mentioned effectiveness, the outstanding effectiveness that the effect on the pocket device equipped with the battery cell by expansion of a battery cell can be lost completely can be further done so.

[0072] Moreover, according to the manufacture approach of the dc-battery of this invention according to claim 5, the outstanding effectiveness that it is stabilized and can manufacture can be done so, having electric reinforcement in a high mechanical-strength list, and aiming at a cost cut for a reliable dc-battery.

[0073] According to the manufacture approach of the dc-battery of this invention according to claim 6, in addition to the above-mentioned effectiveness, it can avoid that a bad influence is done by heat and injection pressure to the circuit board, and the outstanding effectiveness that shortening of the time amount spent on shaping at the simplification list of a manufacturing installation can also be attained can be done so.

[0074] On the other hand, when a battery cell is united with a cell lid inside, while according to the dc-battery structure of this invention according to claim 7 assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut A user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc. Can aim at improvement in dependability, can do so further the outstanding effectiveness that lightweight-ization can also be attained in the thin shape-ized list of a dc-battery, and according to the dc-battery structure of this invention according to claim 8 The outstanding effectiveness that the time amount which in addition to the above-mentioned effectiveness can fabricate with low temperature and low voltage as compared with common resin shaping, can avoid the bad influence to the circuit board by heat or injection pressure, and can simplify the equipment which manufacture takes, and is spent on shaping can also be shortened can be done so.

[0075] Moreover, when a battery cell is united with a cell lid inside according to the manufacture approach of the dc-battery of this invention according to claim 9 Can do so the outstanding effectiveness that it is stabilized and can manufacture, having electric reinforcement in a high mechanical-strength list, and aiming at a cost cut for a dc-battery with high dependability and dimensional accuracy, and according to the manufacture approach of the dc-battery of this invention according to claim 10 In addition to the above-mentioned effectiveness, it can avoid that a bad influence is done by heat and injection pressure to the circuit board, and the outstanding effectiveness that shortening of the time amount spent on shaping at the simplification list of a manufacturing installation can also be attained can be done so.

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TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] However, with the dc-battery structure of the \*\*\*\* former shown in drawing 17 and drawing 18, since a user decomposed easily while leading to a cost rise, in order that components mark may require a man day and great in an assembly, there was also a possibility that short-circuit of a terminal area etc. might occur.

[0005] Moreover, with the dc-battery structure of the \*\*\*\* former shown in drawing 19 and drawing 20, in order that components mark might require a man day and great in an assembly, while leading to the cost rise like the above-mentioned, for the structure which puts a battery cell 1 with the cell lid 32 and covering 50 from both-sides side, the thickness of a dc-battery became thick and there was a possibility of causing trouble to thin shape-ization.

[0006] Furthermore, the terminal 47 for connection in the conventional dc-battery shown in drawing 19 and drawing 20 needed to be mounted in the circuit board 3 of a battery cell 1 again as an expensive thing which fabricated resin and a sheet metal to coincidence so that it might not deform with the spring pressure of the spring terminal by the side of the body of portable telephone.

[0007] While this invention assembles in a components mark list, can reduce a man day sharply and can aim at a cost cut in view of this actual condition A user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc. The suitable dc-battery structure for a pocket device and its manufacture approaches, such as portable telephone which can aim at improvement in dependability, are offered. Moreover, when a battery cell is united with a cell lid inside, while assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut A user cannot decompose easily but can prevent generating of short-circuit of a terminal area etc. Improvement in dependability can be aimed at and it is going to offer further the suitable dc-battery structure for a pocket device and its manufacture approaches, such as portable telephone which can also attain lightweight-ization in the thin shape-ized list of a dc-battery.

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MEANS

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[Means for Solving the Problem] The circuit board by which this invention was prepared in the necessary location of a battery cell, and the positive-electrode terminal which connects this circuit board and a battery cell electrically, It is the dc-battery structure equipped with the negative-electrode terminal which connects said circuit board and battery cell electrically, and the dc-battery structure characterized by having covered the circuit board with resin in said circuit board and a positive-electrode terminal list at least among negative-electrode terminals, and forming the resin shaping section in them is started.

[0009] In said dc-battery structure, it is effective to make resin into a polyamide or polyurethane.

[0010] Moreover, while using as the top-face cross direction edge of a battery cell the location in which the circuit board is prepared to a battery cell into the part by the side of the battery-cell top-face cross direction center section on this circuit board, arrange components with thin thickness, and components with thick thickness are arranged into the part of battery-cell top-face cross direction one end on the circuit board. An inclined plane where thickness becomes small may be established in the resin shaping section which covers said circuit board and is formed in a battery-cell top face as a battery-cell top-face cross direction center section is approached.

[0011] Furthermore, the location in which the circuit board is prepared to a battery cell can also be made into the side face of a battery cell again.

[0012] Moreover, after this invention connects this circuit board and a battery cell electrically through a positive-electrode terminal and a negative-electrode terminal while preparing the circuit board in the necessary location of a battery cell, it installs a battery cell in metal mold, slushes resin, and starts the manufacture approach of the dc-battery characterized by carrying out covering shaping of the circuit board by resin at least among negative-electrode terminals at said circuit board and a positive-electrode terminal list.

[0013] In the manufacture approach of said dc-battery, it is desirable that it is made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin.

[0014] Moreover, the circuit board by which this invention was prepared in the necessary location of a battery cell, It has the positive-electrode terminal which connects this circuit board and a battery cell electrically, and the negative-electrode terminal which connects said circuit board and battery cell electrically. It is the dc-battery structure united with a cell lid inside. In said circuit board and a positive-electrode terminal list The inside of a negative-electrode terminal, It is effective to start the dc-battery structure characterized by having covered the circuit board with resin at least, and fixing a battery cell to a cell lid inside with this resin, and to make resin into a polyamide or polyurethane also in this case.

[0015] Moreover, while this invention prepares the circuit board in the necessary location of a battery cell This circuit board and a battery cell are electrically connected through a positive-electrode terminal and a negative-electrode terminal. Installing this cell lid and a battery cell in metal mold, slushing resin, and carrying out covering shaping of the circuit board by resin at least among negative-electrode terminals at said circuit board and a positive-electrode terminal list, after arranging this battery cell in a cell lid inside It is desirable that the manufacture approach of the dc-battery characterized by fixing a battery cell to a cell lid inside with this resin is started, and it is made to perform covering shaping with low temperature and low voltage also in this case, using a polyamide or polyurethane as resin.

[0016] According to the above-mentioned means, the following operations are acquired.

[0017] In the dc-battery structure of this invention, while the circuit board is prepared in the necessary location of a battery cell This circuit board and a battery cell are electrically connected through a positive-electrode terminal and a negative-electrode terminal, the circuit board is covered with resin at least, and the resin shaping section is formed. By this Since the circuit board of a battery cell is completely sealed by the resin shaping section, while electric reinforcement is obtained by the high mechanical-strength list

Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, it stops generating short-circuit of a terminal area etc.

[0018] In said dc-battery structure, the time amount which this polyamide and polyurethane can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ] since softening temperature is low and the viscosity at the time of melting also has it, and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board by heat or injection pressure by this, and is spent on shaping is also can also be shortened if resin is made into a polyamide or polyurethane. [ low ]

[0019] Moreover, although a battery cell has the inclination for the center section to expand to convex, in connection with a surrounding temperature rise While using as the top-face cross direction edge of a battery cell the location in which the circuit board is prepared to a battery cell into the part by the side of the battery-cell top-face cross direction center section on this circuit board, arrange components with thin thickness, and components with thick thickness are arranged into the part of battery-cell top-face cross direction one end on the circuit board. If an inclined plane where thickness becomes small is established in the resin shaping section which covers said circuit board and is formed in a battery-cell top face as a battery-cell top-face cross direction center section is approached Even if it was made at desertion in the train [ of a flame world ] etc. and the battery cell expanded in the hot ambient atmosphere, there will be no fear of the effect appearing in the pocket device equipped with a battery cell.

[0020] Furthermore, if the location in which the circuit board is prepared to a battery cell is made into the side face of a battery cell again, even if the center section expands to convex in connection with the temperature rise around a battery cell, a fear of the effect appearing in the pocket device equipped with a battery cell will completely disappear.

[0021] Moreover, it sets to the manufacture approach of the dc-battery of this invention. While the circuit board was prepared in the necessary location of a battery cell, after this circuit board and a battery cell were electrically connected through the positive-electrode terminal and the negative-electrode terminal, A battery cell is installed in metal mold, resin is slushed, and covering shaping of the circuit board is carried out by resin at least, and it becomes possible to stabilize and manufacture, having electric reinforcement in a high mechanical-strength list, and aiming at a cost cut for a reliable dc-battery.

[0022] In the manufacture approach of said dc-battery, if it is made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin, it will become avoidable about a bad influence being done to the circuit board with heat or injection pressure, and, moreover, shortening of the time amount spent on shaping at the simplification list of a manufacturing installation will also be attained.

[0023] In the dc-battery structure united with the cell lid inside of this invention on the other hand The circuit board is covered at least with resin by the circuit board and the positive-electrode terminal list among negative-electrode terminals, and a battery cell fixes to a cell lid inside with this resin. By this Since the circuit board of a battery cell is completely sealed by the resin shaping section, while electric reinforcement is obtained by the high mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, Since it stops generating short-circuit of a terminal area etc. and it moreover is not necessary to put a battery cell with a cell lid and covering from both-sides side, Since the thickness of a dc-battery does not become thick, but lightweight-ization is attained at a thin shape-ized list and the circuit board is certainly being further fixed with resin also considering the input/output terminal mounted in the circuit board of a battery cell as easy structure of sheet metal work, If cost reduction also becomes possible and resin is made into a polyamide or polyurethane in said dc-battery structure while being able to maintain sufficient reinforcement Since softening temperature is low and the viscosity at the time of melting of this polyamide and polyurethane is also low, The time amount which can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ], and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board by heat or injection pressure by this, and is spent on shaping is also can also be shortened.

[0024] Moreover, it sets to the manufacture approach of the dc-battery united with the cell lid inside of this invention. While the circuit board is prepared in the necessary location of a battery cell, this circuit board and a battery cell are electrically connected through a positive-electrode terminal and a negative-electrode terminal. This cell lid and a battery cell being installed in metal mold, resin being slushed, and covering shaping of the circuit board being carried out by resin at least among negative-electrode terminals at said circuit board and a positive-electrode terminal list, after this battery cell is arranged by the cell lid inside In order for a battery cell to fix to a cell lid inside with this resin, consequently to press

down a cell lid and a battery cell with metal mold in a manufacture process, It becomes the form where the curvature of a cell lid and expansion of a battery cell are corrected, and has electric reinforcement in a high mechanical-strength list. A dc-battery with high dependability and dimensional accuracy Become possible to stabilize and manufacture, aiming at a cost cut, and it sets to the manufacture approach of said dc-battery further. If it is made to perform covering shaping with low temperature and low voltage, using a polyamide or polyurethane as resin, it will become avoidable about a bad influence being done to the circuit board with heat or injection pressure, and, moreover, shortening of the time amount spent on shaping at the simplification list of a manufacturing installation will also be attained.

[0025]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with the example of illustration.

[0026] Drawing 1 - drawing 4 are examples of a gestalt which carry out this invention, and the part which attached the same sign as drawing 17 and drawing 18 expresses the same object among drawing.

[0027] As shown in drawing 1 , while sticking the circuit board 3 on the top-face cross direction edge of a battery cell 1 with the double-sided tapes 16, such as a polyethylene sheet, in this example of illustration The electrode of the end section of this circuit board 3 and the positive electrode of a battery cell 1 are electrically connected by carrying out spot welding of the positive-electrode terminal 6. And the electrode of the other end of said circuit board 3 and the negative electrode 8 of a battery cell 1 are electrically connected by carrying out spot welding of the negative-electrode terminal 7. The battery cell 1 which assembled as shown in drawing 2 , and stuck said circuit board 3 Install in metal mold 17a manufactured with metals, such as an aluminium alloy as shown in drawing 3 , and 17b, and resin, such as a polyamide, is slushed. As covering shaping of said circuit board 3 and positive-electrode terminal 6, and the negative-electrode terminal 7 is carried out by resin and it is shown in drawing 4 , the resin shaping section 29 is formed, the face plate 15 which wrote a model name, rating, etc. is stuck on the inferior surface of tongue of a battery cell 1, and it is made to have completed the dc-battery.

[0028] The dc-battery attachment slot 18 which puts the battery cell 1 which stuck said circuit board 3 into said metal mold 17a as shown in drawing 3 , Code drawer slot 19a for pulling out the connecting cord 11 prolonged from the circuit board 3, The positive-electrode terminal covering resin restoration slot 20 where wrap resin is filled up with the part of the positive-electrode terminal 6 of a battery cell 1, The negative-electrode terminal covering resin restoration slot 21 where wrap resin is filled up with the part of the negative-electrode terminal 7 of a battery cell 1, Resin impregnation slot 22a for resin impregnation and the guide pin 23 for positioning to metal mold 17b are formed. At the dc-battery attachment slot 18 pars basilaris ossis occipitalis of said metal mold 17a The opening 24 for extruding a battery cell 1 from the dc-battery attachment slot 18 of metal mold 17a after the completion of resin shaping of battery-cell 1 front face is formed.

[0029] Moreover, the circuit board covering resin restoration slot 25 which wrap resin is filled up with the part of the circuit board 3 of a battery cell 1, and is open for free passage into the positive-electrode terminal covering resin restoration slot 20 of said metal mold 17a, and the negative-electrode terminal covering resin restoration slot 21 as shown in said metal mold 17b at drawing 3 , Resin impregnation slot 22b for aligning with code drawer slot 19b for pulling out said connecting cord 11, and resin impregnation slot 22of said metal mold 17a a, and pouring in resin to said circuit board covering resin restoration slot 25, The guide hole 26 for positioning where the guide pin 23 of said metal mold 17a is inserted is formed.

[0030] In addition, said battery cell 1 is covered by shell, such as aluminum, and is usually set to the production process. Although opening of said shell is covered, laser beam welding of that periphery section is carried out to the last and the variation in a dimension arises in this welding part after being filled up with a cell member in the shell to which opening of the negative-electrode 8 side of a battery cell 1 was carried out In order to absorb the variation in this dimension, in the pars-basilaris-ossis-occipitalis list by the side of the negative-electrode terminal covering resin restoration slot 21 of the dc-battery attachment slot 18 of said metal mold 17a in the both-sides section While having embedded the elastic member 27 which consists of sponge of a silicon system which bears the melting temperature of resin, the elastic member 28 of the same quality of the material is embedded in the correspondence location of said metal mold 17b.

[0031] On the other hand, the resin shaping section 29 formed in said battery-cell 1 top face In order to make this inclined plane 30 easy to have formed the inclined plane 30 where thickness becomes small as the top-face cross direction center section of the battery cell 1 is approached, and to form Components arrangement of IC on the circuit board 3 embedded to the interior of the resin shaping section 29 formed in battery-cell 1 top face etc. As shown in drawing 2 , into the part by the side of the top-face cross direction center section of the battery cell 1, components 2a with thin thickness is arranged, and components 2b with thick thickness is arranged into the part of top-face cross direction one end of a

battery cell 1.

[0032] Next, the procedure of manufacturing the dc-battery in the above-mentioned example of illustration is explained.

[0033] First, as shown in drawing 1 , while the circuit board 3 is stuck on the top-face cross direction edge of a battery cell 1 with the double-sided tapes 16, such as a polyethylene sheet When the electrode of the end section of this circuit board 3 and the positive electrode of a battery cell 1 carry out spot welding of the positive-electrode terminal 6, it connects electrically. And when the electrode of the other end of said circuit board 3 and the negative electrode 8 of a battery cell 1 carry out spot welding of the negative-electrode terminal 7, it connects electrically, and as shown in drawing 2 , the assembly of a battery cell 1 is performed.

[0034] Then, the battery cell 1 which stuck said circuit board 3 As shown in drawing 3 , where it was put in in the dc-battery attachment slot 18 of metal mold 17a and the connecting cord 11 of a battery cell 1 is pulled out from code drawer slot 19a in the exterior of metal mold 17a Metal mold 17a and 17b is unified, it is fixed with the fixture which is not illustrated, and resin, such as a polyamide, is poured in from the resin impregnation slots 22a and 22b so that the guide hole 26 of metal mold 17b may fit in to the guide pin 23 for positioning of metal mold 17a. here , since the elastic members 27 and 28 which become the both sides section and the correspondence location of said metal mold 17b from the sponge of a silicon system which bear the melting temperature of resin be embed in the pars basilaris ossis occipitalis list by the side of the negative electrode terminal covering resin restoration slot 21 of the dc-battery attachment slot 18 of said metal mold 17a , even if the variation in a dimension have arise in the welding part of the shell of a battery cell 1 , the variation in this dimension be absorb by said elastic members 27 and 28 .

[0035] If resin, such as a polyamide, is poured in from said resin impregnation slots 22a and 22b, the positive-electrode terminal covering resin restoration slot 20 and the negative-electrode terminal covering resin restoration slot 21 will also be filled up with it while filling up with this resin in the circuit board covering resin restoration slot 25.

[0036] The time amount which this polyamide can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ] since softening temperature is low and the viscosity at the time of melting also has it, and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board 3 by heat or injection pressure by this, and is spent on shaping is also can also be shortened if a polyamide is used as said resin. [ low ] Moreover, if the polyurethane resin of a humidity hardening mold is used as said resin, low temperature and shaping in low voltage are possible like said polyamide. This has [ this polyurethane resin ] a molding temperature still lower than the polyamide resin like molding temperature 210 [\*\*] at 130 [\*\*] extent. Therefore, when polyurethane is used as said resin, it is very effective in there being not only no bad influence to the circuit board, but carrying out resin shaping of the battery cell which is easy to deteriorate at an elevated temperature like a polymer battery.

[0037] After the resin with which said circuit board covering resin restoration slot 25, and the positive-electrode terminal covering resin restoration slot 20 and the negative-electrode terminal covering resin restoration slot 21 were filled up hardens, If cancel immobilization by said fixture, metal mold 17b is removed from metal mold 17a, a battery cell 1 is extruded from the opening 24 of metal mold 17a and it takes out from the dc-battery attachment slot 18 As shown in drawing 4 , the wrap resin shaping section 29 is formed in a battery cell 1 in said circuit board 3 and positive-electrode terminal 6, and the negative-electrode terminal 7, and a dc-battery will be completed if the face plate 15 which wrote a model name, rating, etc. is stuck on the inferior surface of tongue of this battery cell 1.

[0038] Since it becomes impossible for a user to decompose simply while electric reinforcement is obtained by the high mechanical strength list , and components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former since it is completely sealed by the resin shaping section 29 , the circuit board 3 , the positive electrode terminal 6 , and the negative electrode terminal 7 of a battery cell 1 stop thereby , generating short-circuit of a terminal area etc.

[0039] Moreover, although a battery cell 1 has the inclination for the center section to expand to convex, in connection with a surrounding temperature rise The resin shaping section 29 formed in battery-cell 1 top face Since the inclined plane 30 where thickness becomes small is formed as are shown in drawing 4 and drawing 5 , and the top-face cross direction center section of the battery cell 1 is approached, Even if the portable telephone 31 is made at desertion in the train [ of a flame world ] etc. and a battery cell 1 expands in a hot ambient atmosphere, there will be no fear of the effect appearing in the portable telephone 31. In addition, 32 are the cell lid of the portable telephone 31 among drawing 5 .

[0040] At the time of expansion when drawing 6 and drawing 7 establish the above inclined planes 30 in the resin shaping section 29 It is what shows the time of the expansion when not forming an inclined plane 30, respectively. Although the resin shaping section 29 of the dc-battery which expanded interferes with

the cell lid 32 of the portable telephone 31, and there is a possibility that the cell lid 32 may break away when the worst when the height of a dc-battery is set to  $h2 > h1$  and it does not form an inclined plane 30. When an inclined plane 30 is formed, interference with the resin shaping section 29 of a dc-battery and the cell lid 32 of the portable telephone 31 which expanded is avoided, and balking of the cell lid 32 is also prevented.

[0041] In this way, while assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., and can aim at improvement in dependability.

[0042] Although drawing 8 and drawing 9 are the modifications of the gestalt which carries out this invention, the part which attached the same sign as drawing 1 - drawing 4 expresses the same object among drawing and the fundamental configuration is the same as that of the example shown in drawing 1 - drawing 4. The place by which it is characterized [ of this example of illustration ] makes the attachment location of the circuit board 3 to a battery cell 1 the side face of a battery cell 1, as shown in drawing 8 and drawing 9. It is in the point which covers the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 with resin, such as a polyamide, and formed the resin shaping section 29.

[0043] On the relation which covers with resin the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 which were stuck on the side face of a battery cell 1 in the case of the example shown in drawing 8 and drawing 9, and forms the resin shaping section 29, The dc-battery attachment slots 18a and 18b which put the battery cell 1 which stuck the circuit board 3 into metal mold 17a and 17b, The code drawer slots 19a and 19b for pulling out the connecting cord 11 prolonged from the circuit board 3, The positive-electrode terminal covering resin restoration slots 20a and 20b where wrap resin is filled up with the part of the positive-electrode terminal 6 of a battery cell 1, The negative-electrode terminal covering resin restoration slots 21a and 21b where wrap resin is filled up with the part of the negative-electrode terminal 7 of a battery cell 1, The circuit board covering resin restoration slots 25a and 25b which wrap resin is filled up with the part of the circuit board 3 of a battery cell 1, and are open for free passage into said positive-electrode terminal covering resin restoration slots 20a and 20b and the negative-electrode terminal covering resin restoration slots 21a and 21b, There are not an example which shows the resin impregnation slots 22a and 22b for pouring in resin to these circuit board covering resin restoration slots 25a and 25b to drawing 1 - drawing 4 about the other point although it is made to have prepared so that vertical omitting may become symmetrical, and a place which almost changes.

[0044] The attachment location of the circuit board 3 to a battery cell 1 is made into the side face of a battery cell 1 like the example shown in drawing 8 and drawing 9. Even if it covers the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 with resin, such as a polyamide, and forms the resin shaping section 29. Like the example shown in drawing 1 - drawing 4, the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 of a battery cell 1. Since it is completely sealed by the resin shaping section 29, while electric reinforcement is obtained by the high mechanical-strength list. Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, it stops generating short-circuit of a terminal area etc.

[0045] Moreover, even if the center section expands to convex in connection with the temperature rise around a battery cell 1 by forming said resin shaping section 29 in the side face of a battery cell 1, a fear of the effect appearing in the portable telephone 31 completely disappears.

[0046] In this way, while assembling in a components mark list also in the example shown in drawing 8 and drawing 9, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., and can aim at improvement in dependability.

[0047] Although drawing 10 and drawing 11 are other modifications of the gestalt which carries out this invention, the part which attached the same sign as drawing 1 - drawing 4 expresses the same object among drawing and the fundamental configuration is the same as that of the example shown in drawing 1 - drawing 4. The place by which it is characterized [ of this example of illustration ] is in the point which covers the battery-cell 1 whole which stuck the circuit board 3 with resin, such as a polyamide, and formed the resin shaping section 29, as shown in drawing 10 and drawing 11.

[0048] On the relation which in the case of the example shown in drawing 10 and drawing 11 covers the battery-cell 1 whole with resin, and forms the resin shaping section 29, The whole inferior surface of tongue and whole side face of a battery cell 1 are established for somewhat larger dc-battery attachment slot 18' than the appearance of the battery cell 1 of a wrap sake in metal mold 17a by resin. And while forming the support projection 33 for supporting a battery cell 1 in the pars basilaris ossis occipitalis of this dc-battery attachment slot 18'. The whole top face of a battery cell 1 is established for top-face

covering resin restoration slot 25' of a wrap sake in metal mold 17b by resin. And although the support projection 34 for making the top-face necessary part of a battery cell 1 contact, and restraining a motion in the vertical direction of this battery cell 1 is formed in the interior of this top-face covering resin restoration slot 25', about the other point, there are not an example shown in drawing 1 - drawing 4 and a place which almost changes.

[0049] When the battery-cell 1 whole is covered with resin and the resin shaping section 29 is formed like the example shown in drawing 10 and drawing 11, the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 of a battery cell 1 Since sealing performance is raised more by the resin shaping section 29, while electric reinforcement is obtained by the still higher mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former, it stops generating short-circuit of a terminal area etc.

[0050] In this way, while assembling in a components mark list also in the example shown in drawing 10 and drawing 11, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., and can aim at improvement in dependability.

[0051] Drawing 12 - drawing 15 are the second example of the gestalt which carries out this invention. The inside of drawing, While carrying out spot welding of the part which attached the same sign as drawing 19 - drawing 20 through PTC40 to stop the positive-electrode terminal 6 to the positive electrode of a battery cell 1, and stop [ express the same object, ] supply of a current at the time of an elevated temperature etc. Carry out spot welding of the negative-electrode terminal 7 to the negative electrode of a battery cell 1, and spot welding of said positive-electrode terminal 6 and negative-electrode terminal 7 is carried out to the electrode with which the circuit board 3 corresponds, respectively. Connect the circuit board 3 electrically to a battery cell 1, and the insulation sheet 52 for an insulation of the positive-electrode terminal 6 and battery cell 1 accompanied by said PTC40 is made to be placed between the side faces of a battery cell 1. It attaches so that a holder 54 may be put on the circuit board 3 through a double-sided tape 53. Said battery cell 1 is stuck on the inside of the cell lid 32 with a double-sided tape 48. The battery cell 1 which assembled as shown in drawing 13, and was united with said cell lid 32 While carrying out covering shaping of the circuit board 3 on which it installed in metal mold 17a manufactured with metals, such as an aluminium alloy as shown in drawing 14, and 17b, resin, such as a polyamide, was slushed into the inside of said holder 54, and this holder 54 was put by resin As a battery cell 1 is fixed to cell lid 32 inside with this resin and it is shown in drawing 15, the resin shaping section 29 is formed and it is made to complete a dc-battery, carrying out covering shaping of the perimeter of the battery cell 1 containing the positive-electrode terminal 6 and the negative-electrode terminal 7 by resin.

[0052] As shown in drawing 12, in case the guide slot 56 corresponding to the input/output terminal 55 arranged in circuit board 3 front face is formed and the body side of portable telephone is equipped with a dc-battery, said guide slot 56 serves as a guide of the cell terminal by the side of the body of portable telephone, and it enables it to have contacted said holder 54 smoothly in both terminals.

[0053] As shown in drawing 12, the double-sided tape 48 which sticks a battery cell 1 to said cell lid 32 is made into the shape of a frame which extracted the center section, and it is made to have absorbed expansion of the center section of the battery cell 1 at the time of a full charge and an elevated temperature.

[0054] The dc-battery attachment slot 18 which puts said battery cell 1 of the cell lid 32 and one into said metal mold 17a as shown in drawing 14, Resin impregnation slot 22a for resin impregnation and the guide pin 23 for positioning to metal mold 17b are formed. At the dc-battery attachment slot 18 pars basilaris ossis occipitalis of said metal mold 17a The opening 24 for extruding a dc-battery from the dc-battery attachment slot 18 of metal mold 17a after the completion of resin shaping of a dc-battery is formed.

[0055] Moreover, resin impregnation slot 22b for said metal mold 17b aligning with resin impregnation slot 22of said metal mold 17a a, and pouring resin into it, as shown in drawing 14, The guide hole 26 for positioning where the guide pin 23 of said metal mold 17a is inserted, The resin restoration slot 57 where it fills up with the resin poured in from said resin impregnation slots 22a and 22b, the reinforcing rib 58 for reinforcing and supporting the cell lid 32 at the time of restoration of resin, and the passage where it fills up with resin are formed, and the resin seal rib 59 of a \*\*\*\*\* sake is formed for resin.

[0056] Next, the procedure of manufacturing the dc-battery in the above-mentioned example of illustration is explained.

[0057] First, as shown in drawing 12, while spot welding of the positive-electrode terminal 6 is carried out to the positive electrode of a battery cell 1 through PTC40 Spot welding of the negative-electrode terminal 7 is carried out to the negative electrode of a battery cell 1, and spot welding of said positive-electrode terminal 6 and negative-electrode terminal 7 is carried out to the electrode with which the circuit



board 3 corresponds, respectively. The circuit board 3 is electrically connected to a battery cell 1, and it is placed between the side faces of a battery cell 1 by the insulation sheet 52 for an insulation of the positive-electrode terminal 6 and battery cell 1 accompanied by said PTC40. It is attached so that a holder 54 may be put on the circuit board 3 through a double-sided tape 53, said battery cell 1 is stuck on the inside of the cell lid 32 with a double-sided tape 48, and as shown in drawing 13, the assembly of a battery cell 1 is performed.

[0058] Then, the battery cell 1 united with said cell lid 32 So that it may be put in in the dc-battery attachment slot 18 of metal mold 17a and the guide hole 26 of metal mold 17b may fit in to the guide pin 23 for positioning of metal mold 17a, as shown in drawing 14 Metal mold 17a and 17b is unified, it is fixed with the fixture which is not illustrated, and resin, such as a polyamide, is poured in from the resin impregnation slots 22a and 22b.

[0059] When resin, such as a polyamide, is poured in from said resin impregnation slots 22a and 22b, this resin While covering shaping of the circuit board 3 on which it flowed into the inside of a holder 54 and this holder 54 was put is carried out by resin It fills up with said resin in the resin restoration slot 57, and covering shaping is carried out by resin and a battery cell 1 also fixes the perimeter of the battery cell 1 containing the positive-electrode terminal 6 and the negative-electrode terminal 7 to cell lid 32 inside with this resin.

[0060] The time amount which this polyamide can become possible [ fabricating with low temperature and low voltage as compared with common resin shaping ] since softening temperature is low and the viscosity at the time of melting also has it, and can simplify the equipment which manufacture moreover takes by there being no worries about the bad influence to the circuit board 3 by heat or injection pressure by this, and is spent on shaping is also can also be shortened if a polyamide is used as said resin. [ low ] Moreover, if the polyurethane resin of a humidity hardening mold is used as said resin, low temperature and shaping in low voltage are possible like said polyamide. This has [ this polyurethane resin ] a molding temperature still lower than the polyamide resin like molding temperature 210 [\*\*] at 130 [\*\*] extent. Therefore, when polyurethane is used as said resin, it is very effective in there being not only no bad influence to the circuit board, but carrying out resin shaping of the battery cell which is easy to deteriorate at an elevated temperature like a polymer battery.

[0061] If cancel immobilization by said fixture, metal mold 17b is removed from metal mold 17a, the battery cell 1 which fixed to cell lid 32 inside is extruded from the opening 24 of metal mold 17a and it takes out from the dc-battery attachment slot 18 after the resin with which it filled up in said metal mold 17a and 17b hardens, as shown in drawing 15, the resin shaping section 29 will be formed and the dc-battery united with the cell lid 32 will be completed.

[0062] By this the circuit board 3, the positive-electrode terminal 6, and the negative-electrode terminal 7 of a battery cell 1 In order that it may be completely sealed by the resin shaping section 29 and a battery cell 1 may fix to cell lid 32 inside by this resin shaping section 29, while electric reinforcement is obtained by the high mechanical-strength list Since it becomes impossible for a user to decompose simply while components mark stop needing a man day few and great in an assembly and lead to a cost cut compared with the former. Since it stops generating short-circuit of a terminal area etc. and it moreover is not necessary to put a battery cell 1 with the cell lid 32 and covering 50 (to refer to drawing 19) from both-sides side, the thickness of a dc-battery does not become thick but lightweight-ization of it is attained at a thin shape-ized list.

[0063] Moreover, although the terminal 47 for connection in the conventional dc-battery shown in drawing 19 and drawing 20 needs to mount in the circuit board 3 of a battery cell 1 as an expensive thing which fabricated resin and a sheet metal to coincidence so that it may not deform with the spring pressure of the spring terminal by the side of the body of portable telephone Since the circuit board 3 is certainly being fixed with resin also as easy structure of sheet metal work, while the input/output terminal 55 mounted in the circuit board 3 of the battery cell 1 in this example of illustration can maintain sufficient reinforcement, the cost reduction of it also becomes possible.

[0064] Furthermore, since the cell lid 32 and a battery cell 1 are pressed down with metal mold 17a and 17b in a manufacture process, the curvature of the cell lid 32 and expansion of a battery cell 1 are corrected, and manufacture of a dc-battery with high dimensional accuracy is attained again.

[0065] In this way, while assembling in a components mark list, being able to reduce a man day sharply and being able to aim at a cost cut, a user cannot decompose easily, but can prevent generating of short-circuit of a terminal area etc., can aim at improvement in dependability, and can also aim at improvement in lightweight-izing and dimensional accuracy in a thin shape-ized list further.

[0066] Although the thing of a type which makes connection to the body side of portable telephone by the input/output terminal 55 was explained to drawing 12 - drawing 15 As shown in drawing 16, by the connector 10 through a connecting cord 11 It is possible to form the resin shaping section 29 and to unify

the cell lid 32 and a battery cell 1 about the battery cell 1 of a type which makes connection to the body side of portable telephone as well as the case of the example shown in drawing 12 - drawing 15 , and the same operation effectiveness as the above-mentioned is acquired also in this case.

[0067] In addition, the dc-battery structure and its manufacture approach of this invention are not limited only to the above-mentioned example of illustration, cover the circuit board 3 with resin, and are natural.

[ of things for which modification can be variously added within limits to which it does not deviate from the summary of this invention -- it is also possible to cover the positive-electrode terminal 6 and the negative-electrode terminal 7 with another means -- ]

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[Translation done.]

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DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is a decomposition perspective view showing processes with a group, such as the circuit board to the battery cell in an example of a gestalt which carries out this invention.

[Drawing 2] It is a perspective view showing the condition before resin shaping of the battery cell in an example of a gestalt which carries out this invention.

[Drawing 3] It is a perspective view showing the battery cell and metal mold in an example of the gestalt which carries out this invention.

[Drawing 4] It is a perspective view showing the condition after resin shaping of the battery cell in an example of a gestalt which carries out this invention.

[Drawing 5] It is the sectional view of the portable telephone loaded with the battery cell in an example of a gestalt which carries out this invention, and is a sectional view showing the time of un-expanding [ of a battery cell ].

[Drawing 6] It is the sectional view of the portable telephone loaded with the battery cell in an example of a gestalt which carries out this invention, and is a sectional view showing the time of the expansion at the time of establishing an inclined plane in the resin shaping section of a battery cell.

[Drawing 7] As compared with drawing 6 , it is a sectional view showing the time of the expansion when not establishing an inclined plane in the resin shaping section of a battery cell.

[Drawing 8] It is a perspective view showing the battery cell and metal mold in a modification of the gestalt which carries out this invention.

[Drawing 9] It is a perspective view showing the condition after resin shaping of the battery cell in the modification of the gestalt which carries out this invention.

[Drawing 10] It is a perspective view showing other battery cells and metal mold in a modification of the gestalt which carries out this invention.

[Drawing 11] It is a perspective view showing the condition after resin shaping of the battery cell in other modifications of the gestalt which carries out this invention.

[Drawing 12] It is a decomposition perspective view showing processes with a group, such as the circuit board to the battery cell united with the cell lid inside in the second example of the gestalt which carries out this invention.

[Drawing 13] It is a perspective view showing the condition before resin shaping of the battery cell united with the cell lid inside in the second example of the gestalt which carries out this invention.

[Drawing 14] It is a perspective view showing the battery cell united with the cell lid inside in the second example of the gestalt which carries out this invention, and metal mold.

[Drawing 15] It is a perspective view showing the condition after resin shaping of the battery cell united with the cell lid inside in the second example of the gestalt which carries out this invention.

[Drawing 16] It is a perspective view showing the condition after resin shaping of the battery cell united with the cell lid inside in the modification of the second example of the gestalt which carries out this invention.

[Drawing 17] It is a decomposition perspective view showing processes with a group, such as the circuit board to the battery cell in a conventional example.

[Drawing 18] It is a perspective view showing the completion condition of the dc-battery in a conventional example.

[Drawing 19] It is a decomposition perspective view showing processes with a group, such as the circuit board to the battery cell united with the cell lid inside in other conventional examples.

[Drawing 20] It is a perspective view showing the completion condition of the dc-battery united with the cell lid inside in other conventional examples.

[Description of Notations]

1 Battery Cell  
2a Components  
2b Components  
3 Circuit Board  
6 Positive-Electrode Terminal  
7 Negative-Electrode Terminal  
8 Negative Electrode  
17a Metal mold  
17b Metal mold  
29 Resin Shaping Section  
30 Inclined Plane  
31 Portable Telephone  
32 Cell Lid

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[Translation done.]

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

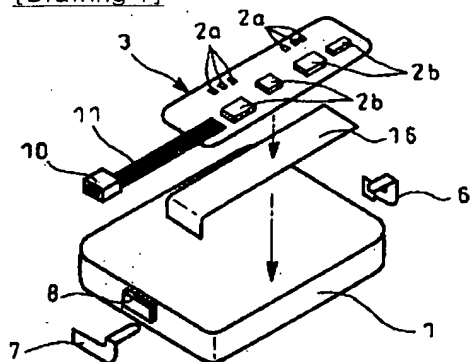
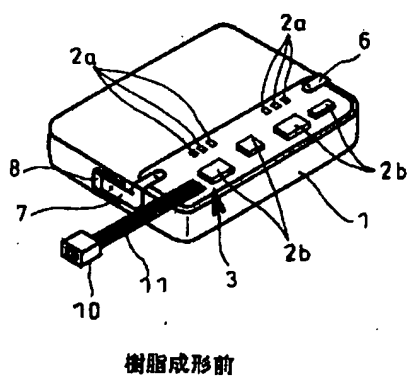
2.\*\*\*\* shows the word which can not be translated.

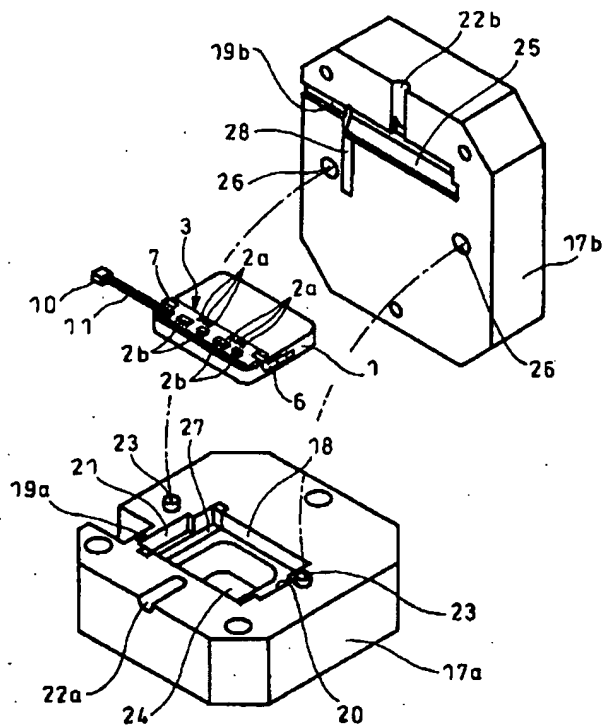
3.In the drawings, any words are not translated.

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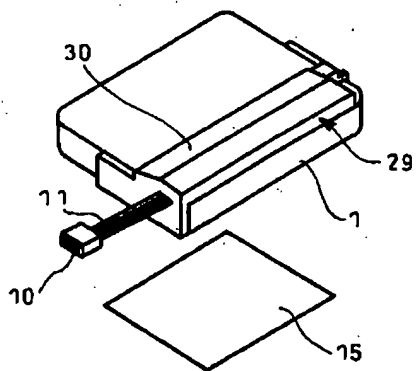
DRAWINGS

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[Drawing 1][Drawing 2][Drawing 3]

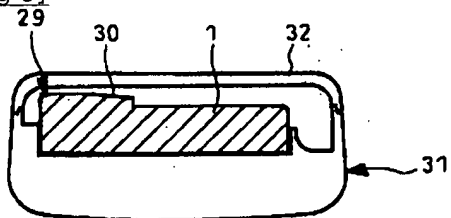


[Drawing 4]



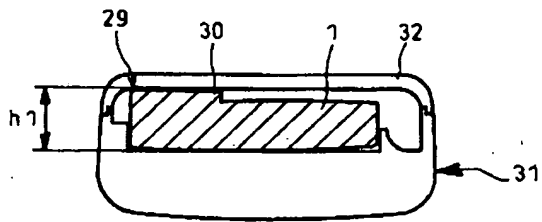
**樹脂成形後**

[Drawing 5]



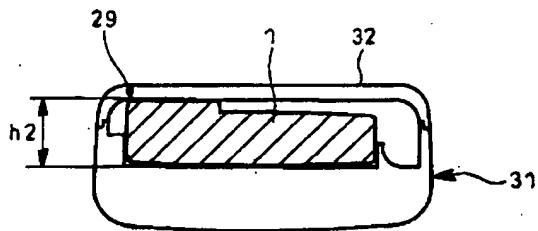
**携帯用電話機の断面  
(非膨張時)**

[Drawing 6]



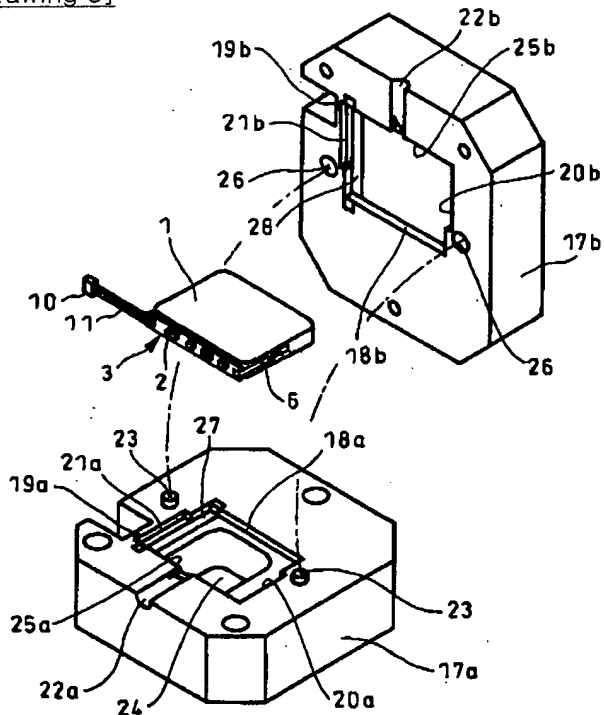
携帯用電話機の断面  
(傾斜面を設けた場合の膨張時)

[Drawing 7]



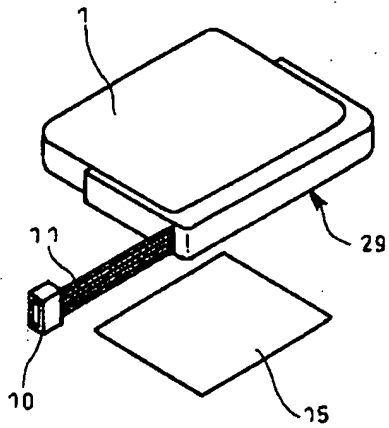
携帯用電話機の断面  
(傾斜面を設けない場合の膨張時)

[Drawing 8]



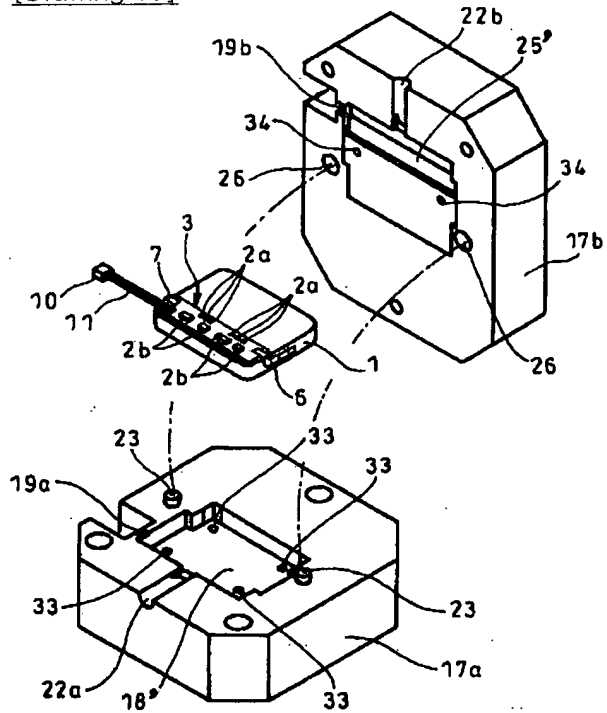
[Drawing 9]



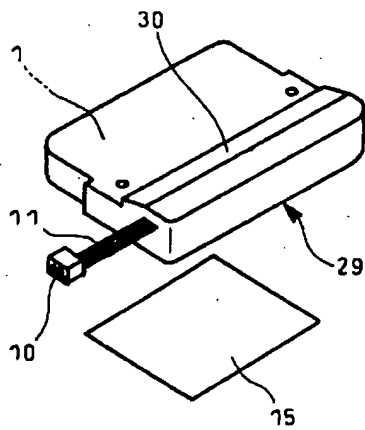


樹脂成形後

[Drawing 10]

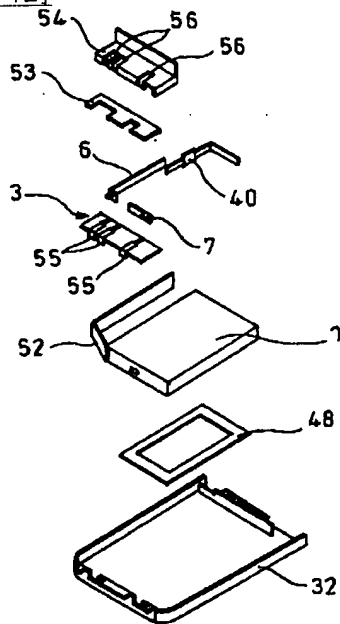


[Drawing 11]

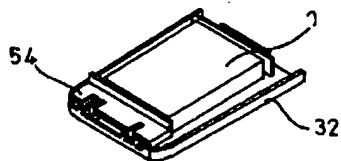


樹脂成形後

[Drawing 12]

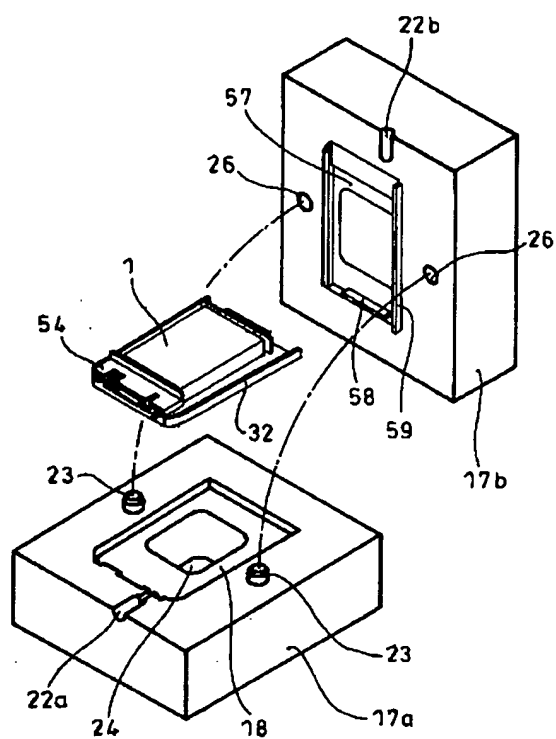


[Drawing 13]

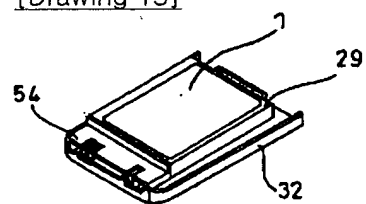


樹脂成形前

[Drawing 14]

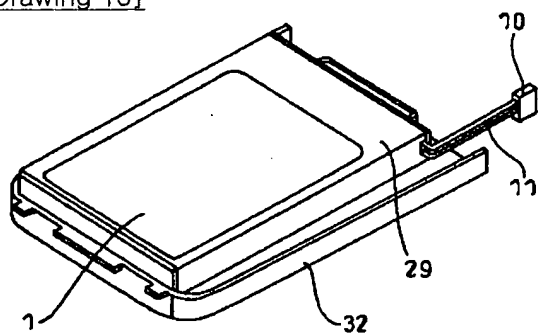


[Drawing 15]



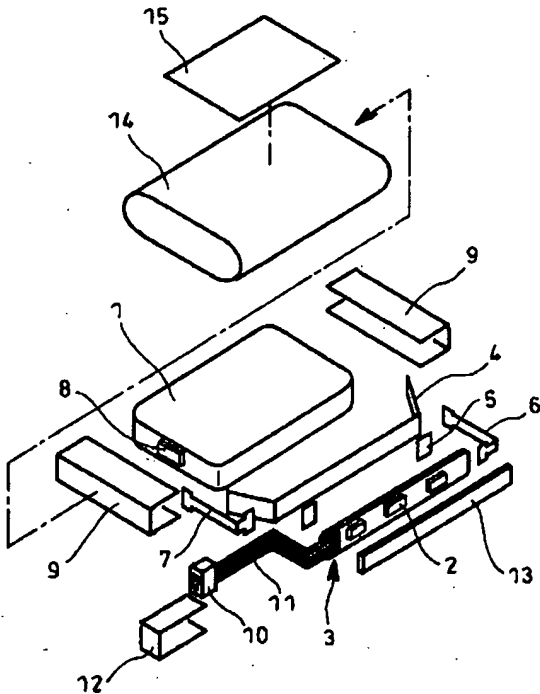
**樹脂成形後**

[Drawing 16]

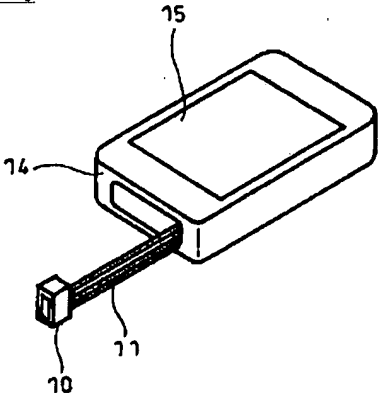


### 樹脂成形後

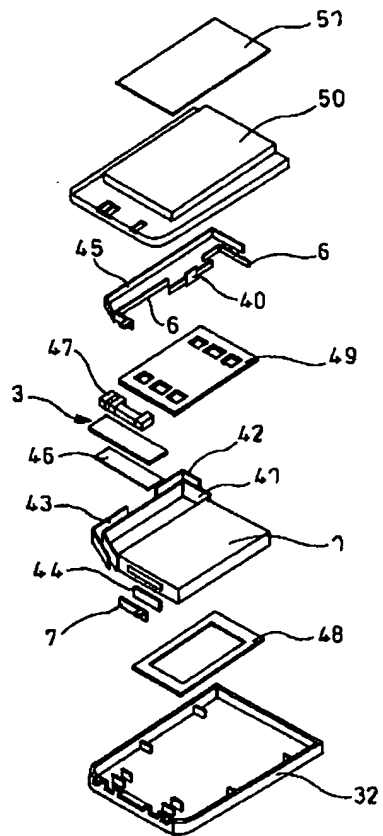
[Drawing 17]



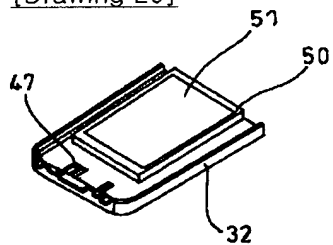
[Drawing 18]



[Drawing 19]



[Drawing 20]



[Translation done.]